PROJECT NUMBER: 2507
PROJECT TITLE: Radiochemical Investigations
PROJECT LEADER: S. B. Hassam
PERIOD COVERED: April, 1988

SIDESTREAM SMOKE

A. **Objective**: Develop and apply methods for collection and radiochromatography of SS from cigarettes labeled with ^{14}C-glycerol.

B. **Results**: (1) Development of a method to measure radioactivity in SS gas phase from ^{14}C-glycerol cigarettes using the new gas chromatography radioactivity detector is in progress. Preliminary investigations show that the detector sensitivity will be adequate to measure the amount of activity present in SS; the lower activity present in MS gas phase requires larger sample volumes to be injected, with the potential problem of overloading the GC column. Currently a GS-Q megabore column is being used for separation of gas phase components. Chemical detection of peaks is done with a TCD positioned prior to the radioactivity detector. Problems have been experienced with the TCD when the column is operated below ambient temperature. Attempts to correct this by gas flow modulation resulted in loss of sensitivity and resolution.

In order to facilitate sample introduction and to provide a reproducible means of sample injection, a six-way Valco valve with a sample loop (250 µL) was installed on the gas chromatograph. The valve was connected to a calibration gas mixture cylinder via a tee, which also allows the introduction of ^{14}C-samples or other gases into the column.

(2) Using TLC and RP-HPLC, radiochromatography of samples from ^{14}C-glycerol-sprayed filler (code 10-21-87) was completed. An ethanol extract of the filler and a 2,4-DNPH extract of the filler showed all activity to be associated with ^{14}C-glycerol. This indicates no degradation of the radiolabeled filler occurred prior to smoking. Smoke samples from ^{14}C-glycerol cigarettes (see March monthly report) were concentrated at ambient temperature under a stream of nitrogen gas. Radiochromatography of these samples showed changes in the relative amounts of ^{14}C-glycerol vs. ^{14}C-products present in the original samples, presumably due to physical losses and/or chemical destruction. Nevertheless, only previously present ^{14}C-products were observed, namely acetaldehyde in SS traps and HCHO in the smoking chamber wash. There is either no ^{14}C-acrolein present, or the amount is at the level of background activity.

(3) Summaries of various aspects of the SS/glycerol project are being written.

C. **Plans**: Continue evaluation of the gas radiochraomatography system; continue documentation of completed work.

D. **References**: NB 8386, 8630, 8631 and 8610.

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